A Critical Appraisal of "*Heat or Cold for the Relief of Low Back Pain?"*

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Abstract

This is a critical appraisal of a 1967 study regarding the difference that heat packs and ice massages have as a treatment of low back pain. Although published in a prestigious physical therapy journal, this article has many holes in the research and design when compared to the thorough standards of today's studies. Each section of the 1967 study is discussed in detail, listing both good and bad aspects of the article, ultimately coming to the conclusion that this study does not provide enough statistically sound evidence to implement their findings into today's clinics. The findings suggest that heat treatment is better suited for acute low back pain (less than forty-eight hours post onset of pain) and that ice massage is better suited for chronic low back pain (more than fourteen days post onset of pain).

Introduction

Low back pain is one of the most common complaints in the physical therapy field. It can be caused by simple everyday activities such as poor posture, sitting for extended periods of time, incorrect body mechanics, etc. Relief from low back pain symptoms is most commonly found in the external application of either a hot or cold pack, tools that are both inexpensive and usually readily available. Deciding which treatment, hot or cold, is more beneficial has been a largely controversial issue in the physical therapy field. Patients and health care providers alike get confused on when and why to use heat or ice. So Is heat or cold therapy a more effective pain management treatment for patients with low back pain? This critical appraisal examines the contrasted therapeutic effect of heat and cold therapy on nonspecific low back pain.

Methods

The article being appraised comes from the *U.S. National Library of Medicine: PubMed* database using the keyword search "low back pain heat or ice". The primary limitation placed on this article search was that it must exclusively look at low back pain and compare both hot and cold treatments. Any articles that tested just one of the treatments (heat or ice) or included ailments other than low back pain were excluded. These limitations and exclusions were put into place in order to streamline this appraisal by providing a direct comparison of hot and cold treatments and ensure that low back pain was the primary focus. When researching this topic, the various articles were reviewed as they were discovered.

This article is from the *Journal of the American Physical Therapy Association* Volume 47, issue 12, December 1967. It is written by Betty R. Landen, a Major in the Army Management Staff College (AMSC). The article is a year-long that study takes place at the U.S. Army General Hospital in Frankfurt, Germany. This article was chosen above others for a number of reasons. This is a government-funded experiment, as it occurs at a U.S. Army hospital and conducted by a member of the army, and it appears in a very prestigious physical therapy journal. However, this study is 52 years old and is lacking what are considered "basic necessities" of credible articles today. This juxtaposition posed an interesting platform for a critical appraisal where the "old" standards of research can be compared to the new.

Results

Summary of Study

This article investigates the comparative effects that heat packs and ice massages have as a symptomatic treatment for nonspecific low back pain. The study was conducted at the U.S.

Army General Hospital in Frankfurt, Germany and only included those patients with a chief complaint of low back pain. Subjects within the hospital were chosen to be in the 'heat' or 'ice' group randomly, regardless of age, sex, or severity of symptoms. All patients were treated twice daily lying on their stomachs with a pillow under their hips. The "heat" group received two hot packs across their lumbosacral area, and the "cold" group received ice massages with large ice cubes that were shaped by freezing water in empty cans. Both groups received their corresponding treatment twice a day for 20 minutes each plus a standard program of exercise. There were 143 patients that were admitted with the chief complaint of low back pain within the period of one year. However, 26 patients dropped out of the study for various reasons that were discussed in the article, leaving 117 patients. Of these 117, 59 were treated with ice and 58 were treated with heat. Within these two groups, the subjects were further divided into subgroups of acute, subacute, and chronic. To evaluate the effect of heat and ice treatments, both length of hospitalization and relief of symptoms were considered. Length of hospitalization is a measurable, objective analysis. Pain, however, can only be measured subjectively. The difference in hospitalization time for the 117 patients was not significant between the two treatments, but there were major differences observed between the acute and chronic subgroups. The acute patients that were treated with hot packs had shorter hospitalization times than those treated by ice massages. However, the chronic patients that were treated with ice massages had shorter hospitalization times.

Appraisal of the Study Introduction

The introduction does a good job with introducing the topic as a whole and narrowing it down to relate to the specific case study. It begins with the general controversy of heat vs. cold for general pain

relief. It then quotes another research article that is related and goes into the specifics of this article: the effects of heat and cold as a treatment for low back pain. The conclusion is that there is little known when determining whether heat or cold is better for pain relief. Both have been proven as effective treatments, but which one is better? This is the question posed in the case study with the purpose of finding out if one treatment is more effective than the other. The author used four other literatures to support their study in the introduction. The literatures used range from the 1940s to the 1960s, fairly appropriate dates considering when this article was written. All of the key words in the title, *'Heat or Cold for the Relief of Low Back Pain?',* are addressed in the introduction. The dependent variables are the prescribed exercise program that will be given to all the patients, the time of day, and frequency of treatments. The two independent variables are the hot pack treatment and the ice massage.

The introduction is concise and factual but lacking in the background information already available for back pain, in particular. Although the long controversy between heat and cold is addressed, there is absolutely no mention of back pain, its causes, statistics, common remedies, etc. Why is back pain relevant and why is it the main focus of this article? These are questions that should be answered in the introduction.

Appraisal of the Study Methods

The patient exclusions and inclusions are clearly stated right off the bat and the subgrouping of patients into acute, subacute, and chronic subgroups are made clear. Unfortunately, those are the only two positive points in this paragraph.

The methods do not follow a chronological order. Instead, it jumps into a treatment schedule and then awkwardly backtracks to explain the admission process of the patients and how they were sub-grouped before treatment began. The listed course of treatment is confusing, exchanging the terms "ice-

massage" and "ice pack" with no explanation. It also contradicts the time spent on the ice massage, first stating the patients are massaged until area is numb (ten to twelve minutes), and then later stating that the "ice packs" and heat are both twenty minutes long. One might speculate that an ice massage was performed prior to the ice pack, but the phrase "ice pack" was not mentioned anywhere else in the article and results only refers to "ice massages". The sociodemographic of the patients is all over the place, with the only thing being in common is a chief complaint of low back pain. There is no detail provided regarding the gender or age of the patients within each group and subgroup. There is also no regulation of temperatures mentioned for the heat packs and no mention as to whether anything was blinded in this study.

Appraisal of the Study Results

The results section is actually much more organized and clear than the methods section. It follows an order that makes sense and is easily readable, whereas the methods section seemed random at times and did not flow in the order of events. The research question posed at the beginning of the article is directly addressed and subject attrition is properly explained. All outcome measures are explained in detail, including whether or not it was subjective or objective, how each measure was used, and the results. Table 1, which presented data from the individual subgroups, was put together well.

There was no formal statistical analysis performed and no reference of minimal clinically important difference (MCID) or number needed to treat (NNT). In addition, the line graphs used to depict response to treatment were confusing. There is no time component in the graph and the results would be much more clear in a bar graph or table format.

Appraisal of the Study Discussion

The results are summarized well at the beginning of this paragraph and the author finally mentions statistical analysis, claiming the study group precluded meaningful statistical analysis.

Although the results are put in a much simpler manor, that is the only thing the discussion does. There is no reference to limitations of the study, possible incongruencies, clinical significance, or future application. This paragraph might as well be tacked on to the end of the results section because there was no actual discussion regarding the findings of this study.

Discussion

Low back pain is one of the most common complaints in the physical therapy field and can be caused by everyday activities, such as poor posture, sitting for extended periods of time, incorrect body mechanics, etc. External application of a heat or cold pack is a prevalent treatment due to the fact that both are inexpensive and generally readily available. But how can one decipher when and why to use a hot or cold pack? This has been a controversial issue among physical therapists for decades and there are countless different opinions on the subject.

Although heat and ice are both credible treatments, I would take the specific findings of this study with a grain of salt. Fortunately, choosing between the treatment of heat and ice for low back pain management is not a high-risk ordeal. Assuming one treatment is in fact better than the other, the negative outcomes would most likely be no change in symptoms, although there will be some cases in which pain slightly worsens. If this article does hold true to its findings, it could save time by eliminating the trial-and-error method and providing the best treatment possible for patients. Seeing as there is no severe risk to implementing this heat and ice method regarding acute and chronic subgroups of low back pain, the benefits outweigh the risks. That being said, there are countless holes in this study. To begin, this study was done 52 years ago. This is, however, a primary reason I am appraising this

article. Many students do not look at the publication date when researching and citing articles in support of their own projects. It is important to emphasize relevancy and staying on top of current events, no matter what field a person is in. No part of this study was blinded, there was no control, the methods are beyond confusing, and the independent variables were not temperature-regulated. On top of that, the subject attrition was 18%.

Based on this article alone, I would not implement this style of heat pack and ice massage application. By style, I mean applying heat to acute low back pain patients (less than forty-eight hours post onset of pain) and ice massage to chronic low back pain patients (more than fourteen days post onset of pain). These findings are, in fact, opposite of what I have heard throughout my time as a patient of physical therapy. This actually intrigued me quite a bit, but I would not implement this style into my own physical therapy practice without further research of other, more recent, studies.